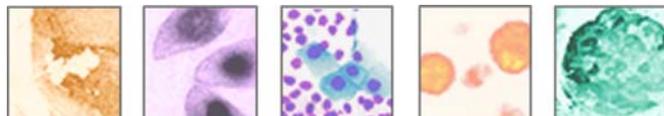


**7th Stem Cell  
Workshop**

***“Stem Cells,  
Proteomics & the Media”***

Tuesday 11, October 2005  
12:30 pm to 6:30 pm  
Lecture Theatre & Function Room  
Edmund Blackett Building  
Prince of Wales Hospital, Randwick, NSW



**Welcome to the 7<sup>th</sup> Stem Cell Workshop** supporting stem cell research and the emerging stem cell industry in Australia.

*There have been many recent advances in proteomic technology, with direct benefits for the health and medical industry. While the therapeutic potential of stem cell therapies is well recognised, our understanding of proteins involved in stem cell growth, maintenance and proliferation is limited. For stem cell research to advance there needs to be development of a number of key areas, one of which is proteomics. The first session of the Workshop brings together experts in this field to discuss and develop links and applications of proteomics to stem cells research.*

*In a world where public opinion is greatly influenced by the media, it is important that scientists are able to communicate effectively to promote a more informed public debate on stem cells. In the second session, eminent science reporters will discuss what makes a good story and how scientists can work with journalists to provide the most comprehensive and informed, but least controversial coverage of stem cell research developments. This is of special importance in the current climate during which the Lockhart Committee is preparing a report for Federal Parliament on the future of stem cell research in our country.*

*Thanks go not only to the invited experts in the two sessions, but also the chairmen, Dr Steven Mahler from the University of New South Wales and Sophie Scott from ABC Television for giving of their time and expertise.*

*We would also like to thank the sponsor Leica-Microscopes, BD Bioscience, Thermo-electron Corporation and Chemicon that have been so committed to supporting the NSW Stem Cell Network.*

*Enjoy this Workshop and we look forward to keeping in touch with you through the Network.*

*Kind regards,*

**Sophie Diller**  
**Manager**

**Prof Bernie Tuch**  
**Director**

**NSW Stem Cell Network**



7th Stem Cell Workshop

Proteomics, Stem Cells & the Media

Presented by  
NSW Stem Cell Network

12:30pm	Registration
1:00pm	Welcome <b>Prof Bernie Tuch, Prince of Wales Hospital</b>
<b>Session 1: PROTEOMICS AND STEM CELLS</b> Chair: Dr Steven Mahler, University of New South Wales	
1:10pm	Proteomics: recent advances and application to stem cell research. <b>Dr Jenny Harry, Proteome Systems Ltd</b>
1:35pm	Proteins in stem cell research <b>Mr Warwick Murphy, Australian Stem Cell Centre</b>
2:00pm	From 2D to 3D: new technologies for differential expression analysis of CD4+ T-cells in the lymphoid lineage. <b>Dr Valerie Wasinger, University of New South Wales</b>
2:25pm	The use of information technology in the identification and characterization of proteins. <b>Dr Jonathan Arthur, University of Sydney</b>
2:50pm	High Value, Low Volume Sample Prefractionation for Proteomics <b>Dr Brad Walsh, Minomic Pty Ltd</b>
3:15pm	Afternoon Tea
<b>Session 2: STEM CELLS AND THE MEDIA</b> Chair: Sophie Scott, ABC Television	
3:45pm	The Hard Cell: Challenges for reporters covering stem cell and cloning research. <b>Deborah Smith, Sydney Morning Herald</b>
4:10pm	Media spin and stem cells <b>Dr Elizabeth Finkel, independent science writer</b>
4.35pm	Promoting Stem Cells: Strategies for the future <b>Lou Caruana, independent science communication expert</b>
5.00pm	Refreshments

## PROTEOMICS: RECENT ADVANCES AND APPLICATION TO STEM CELL RESEARCH

Recent advances in the field of proteomics have provided improved methods for fractionation, identification, quantitation and characterisation of proteins. Stem cell research stands to benefit from these advances through the detection of discrete changes in protein expression and modification. This presentation will address how proteomics can be used to establish global standards for stem cell research and further the understanding of cellular differentiation. Proteomic analysis of stem cells to facilitate the validation of new therapeutic compounds will also be discussed.



**Dr Jenny Harry,**  
**Deputy CEO, Proteome Systems Ltd**

Dr Jenny Harry is a founder of Proteome Systems who has recently joined the Board and been appointed as Deputy Chief Executive Officer. Jenny has had an active role in growing the business from inception. She served as Head of Discovery and Diagnostics when these aspects of the business were initially established, and she has overseen their evolution to be the major thrust of the business. In this role, she had responsibility for developing and implementing the business strategy for Discovery & Diagnostics and sourcing multinational discovery collaborations in areas of science which are of global significance such as respiratory medicine, infectious disease, cancer, ageing and neurodegenerative disease.

Dr Harry has been instrumental in developing new business opportunities for Proteome Systems as it moves into the broader fields of point of care diagnostics (eg partnership with the Geneva-based Foundation for Innovative New Diagnostics (FIND)) and drug development (overseeing the integration of Eukarion Inc into the business). She plays an active role in guiding the development of Proteome Systems' culture and people management strategies.

From 1997 to 1998, Dr Harry was Head of Discovery at APAF, (The Australian Proteome Analysis Facility, a major national facility) during which time she implemented the Facility's first commercial project in collaboration with the Chiron Corporation, USA. Prior to 1997, she held post-doctoral positions in developmental and molecular biology in leading laboratories at the University of Manchester, UK and the University of Melbourne, Australia.

## PROTEINS IN STEM CELL RESEARCH

Research on human embryonic and adult stem cells is a key undertaking for the Australian Stem Cell Centre (ASCC). A long term objective for this research endeavor is the development of new and innovative cell therapies for a range of human diseases. Implicit in this objective is the development of methods and systems for growth and manipulation of adult stem cells, human embryonic stem cells and their differentiated progeny. These systems need to ensure the biological and functional potential of cells and generate cell products that are safe for human use. Accordingly, it will be necessary for cells to be derived and propagated under completely defined conditions where growth is predictable and the final cell product is free from non-human proteins and infectious agents. In the absence of supporting fibroblasts or feeder cells, survival, proliferation and differentiation of human embryonic and adult stem cells is absolutely dependent on provision of proteins that provide structural support, mitogenic signals and differentiation cues.

Presently, there is a significant global research effort in identifying individual proteins and combinations of proteins that are required for this controlled propagation of stem cells. The Major National Research Facility (MNRF) laboratories are contributing to this effort by producing a limited range of proteins that have putative roles in stem cell growth and development. At present the lipid modified proteins Wnt-3a and Wnt-5a have been purified and distributed to research groups within Australia. Additional proteins including members of the BMP family, noggin, and various domains of specific extracellular matrix proteins are being expressed and purified by the MNRF.



### **Warwick Murphy**

**Laboratory Manager, Australian Stem Cell Centre Ltd**

Warwick Murphy has extensive laboratory experience spanning 12 years. After completion of a MSc degree (1992) at the Royal Children's Hospital (Surgical Research) in Melbourne, Warwick researched the mechanisms of onset of ocular melanoma under the direction of Joe Sambrook at the Peter MacCallum Cancer Centre. After commencing MBA studies in 1999 Warwick moved away from the laboratory bench into administration in the role of Laboratory Manager of the Research Division at Peter MacCallum Cancer Centre. Warwick commenced as Laboratory Manager (MNRF) with the Australian Stem Cell Centre in August 2004.

## FROM 2D TO 3D: NEW TECHNOLOGIES FOR DIFFERENTIAL EXPRESSION ANALYSIS OF CD4+ T-CELLS IN THE LYMPHOID LINEAGE.

In Biotechnology, the speed at which research objectives have been achieved is technology driven. Over the last decade quantitative biological analysis has been performed at the genomic, transcribed and translated level; through large scale DNA sequencing, genome wide genetic analysis, DNA and protein chips, and two-dimensional gel electrophoresis (integrated with), liquid chromatography and mass spectrometry (MS). As a science, proteome studies are an extension of the process of linking proteins to their respective genes.

One of the major challenges facing protein analysis is the dynamic range of expression of proteins within complex samples, which is greater than the range detectable by current technologies. Additionally, there are often just a few highly abundant proteins, which mask the detection of lower abundance and biologically significant proteins. This is a particular problem for analysis of samples when the overall protein concentration is very low or when sample volume in addition to concentration is sparse and acquired with difficulty.

It is only through the development of new methodologies to selectively enrich for some of the more poorly expressed proteins from the proteome, that the greatest opportunity to identify significant correlations between disease and healthy states, the discovery of committed cell differentiation pathways, and protein complexes in the context of entire biological systems will be established.

This talk will focus on the technologies used to establish the CD4+ and CD8+ proteomic profiles as one component of a much larger project investigating the differences in protein expression during cell maturation of CD34+CD38- and CD34+CD38+ stem cells collected from cord blood.



### **Dr Valerie Wasinger**

**Biomedical Mass Spectrometry Facility, The University of New South Wales**

From the commencement of her PhD studies in 1995, Dr Wasinger has been associated with various aspects of proteome research. These include a study of expression differences in MET4A pre/post crisis cells at the Centre for Proteome Research and Children's Medical Research Institute (part time) while studying for her PhD on proteome analysis of *Mycoplasma genitalium* at The University of Sydney. This was followed by post-doctoral studies on the development of mass spectral methods to enable detection of proteins (translationally modified) and complexes at the The Garvan Institute of Medical Research. In her role at the Bioanalytical Mass Spectrometry Facility, The University of NSW, she has been specialising in the detection of low abundance proteins and identification of modified proteins and peptides in complex mixtures. Projects include the HuPO- identification of human plasma and serum proteins (CI), proteomics of adult stem cell differentiation process (CI) and the proteomics of vesicle trafficking in Diabetes II. She has also experience with the new and novel iTRAQ method for multiplex analysis

# THE USE OF INFORMATION TECHNOLOGY IN THE IDENTIFICATION AND CHARACTERIZATION OF PROTEINS

Proteomics, the study of the entire protein complement of the genome, brings with it a whole new series of challenges in bioinformatics. Proteomic information contains an added layer of complexity due to issues like splice variation, post-translational modification, differential protein expression, acquisition and analysis of mass spectrometry data, and the prediction and visualisation of three-dimensional structure. A correct understanding of many of these issues is particularly important in elucidating the regulatory mechanisms of cell proliferation, migration, and differentiation. This seminar will provide an introduction to the use of information technology in proteomics and demonstrate solutions to some specific challenges, namely, the effective management of proteomic data resources and the use of 3D structural modelling in understanding protein phosphorylation.



## **Jonathan Arthur**

**Central Clinical School of the Faculty of Medicine, University of Sydney**

Dr Jonathan Arthur is the Sesqui Lecturer in Bioinformatics within the Central Clinical School of the Faculty of Medicine and the Sydney University Biological Informatics and Technology Centre of the University of Sydney. In this role, he is responsible for the development of postgraduate degree courses and training programs in bioinformatics as well as maintaining an active bioinformatics research program. Jonathan's specific research interests are in the area of proteomic bioinformatics, including the development of more effective techniques for the identification and characterization of biomarkers using mass spectrometry, as well as the application of bioinformatics techniques to research in multiple sclerosis.

Prior to taking this position at the University of Sydney, Jonathan spent almost five years with Proteome Systems Ltd, first as Senior Bioinformatics Scientist and then as Technical Learning and Development Specialist in Informatics. In these roles he was responsible for all aspects of learning and development in regard to Proteome Systems' software product suite, including technical sales demonstrations and the development and execution of product training programs. He also coordinated bioinformatics research and development projects in line with the company's Discovery research programs in cancer, infectious disease, and cystic fibrosis, as well as the design and development of the first prototype of BioinformatIQ™ a proteomics information management system.

Jonathan has a Ph.D. in Theoretical Chemistry from the University of Sydney and postdoctoral experience in computational structural biology from a period of research at Fox Chase Cancer Centre in Philadelphia, USA. He is the President of Bioinformatics Australia and serves on the NSW Management Committee for AusBiotech, the NSW Working Party of Multiple Sclerosis Research Australia, and the Client Services Committee of the Board of Multiple Sclerosis New South Wales.

# HIGH VALUE, LOW VOLUME SAMPLE PRE-FRACTIONATION FOR PROTEOMICS

Traditionally the successful incorporation of prefractionation technologies in proteomic studies has been problematic. Many of the techniques developed to date require large sample sizes in order to compensate for non-specific losses, and often rely on harsh conditions to solubilise the sample, particularly in methodologies that depend on protein precipitation.

Ideally, in order to increase the dynamic depth of proteins visualized, downstream proteomic studies require procedures that effect fractionation of multiple samples quickly, in a non-denaturing environment and that yield simpler protein mixtures in a format compatible with analysis by either 2-DE or LC-MS. This presentation will outline the development and manufacture of a new micro- device that uses electrically coupled ampholyte-free membrane technology to separate multiple samples into fractions based on charge and/or size.

Fractionation is carried out using sample volumes as low as fifty microlitres and can be completed in a timeframe of minutes. The technology is applicable to a diverse range of biological samples, including cellular lysates, plasma and urine. Results showing the removal of abundant proteins, isolation of narrow molecular weight cuts, removal of salts and direct LC-MS of low molecular weight species will be presented.



**Brad Walsh**  
**Minomic Pty Ltd, CEO**

Dr Brad Walsh is CEO of Minomic Pty Ltd, a biotechnology company located in Frenchs Forest. Brad has over 20 years experience in biotechnology and has been associated with proteomics since its inception. He structured the first high throughput proteome facility including staffing, design and fit-out of the laboratories and the business systems used to run the facility. He has worked on commercialisation of diagnostics since 1985 and proteome technology since 1996.

He holds a BSc Hons from Sydney University and a PhD from Macquarie University as well as completing the General Manager's Program from the Australian Graduate School of Management.

He is co-author of over 50 peer reviewed papers and two patents. His company has recently received a number of awards including admission to the Australian Technology Showcase and Winner of "2005 Best Investment Pitch" for the On-the-Spot Investment Competition.

## **THE HARD CELL: CHALLENGES FOR REPORTERS COVERING STEM CELL AND CLONING RESEARCH.**

Research on embryonic stem cells and cloning is one of the most contentious and challenging issues for science reporters to cover. Apart from the many scientific advances, there are ethical and commercial implications to be explored. Yet many readers still only have a basic understanding of the area.

The presentation will provide an insight into the running of a large daily newspaper and how news judgements are made, with specific reference to stem cells and cloning. Issues for reporters such as language, balance of opinion, speedy access to expert comment, context, and hype will be discussed, as well as the power of the media to influence national debate and reveal the facts.



**Deborah Smith**  
**Sydney Morning Herald**

Deborah Smith is Science Editor at the Sydney Morning Herald. She obtained an honours degree in physical chemistry at the University of Sydney and was an analyst with the NSW Department of Health before becoming a journalist.

In her 25 year career as a reporter she has worked for The National Times, The Times on Sunday, The Independent Monthly and The Age, as well as the Herald, where she has been for the past 15 years. She has specialised in science and medical reporting for much of this period but has also held positions as a foreign correspondent, senior feature writer, daily feature page editor and opinion page editor. She rejoined the Herald news team as science writer in 2000.

She was a finalist in the Eureka Prize for Science Journalism in 2002 and 2004 and won the award in 2005 for a body of work which included reports on stem cells as well as the discovery of a prehistoric species of tiny humans on the Indonesian island of Flores.

## MEDIA SPIN AND STEM CELLS

During Australia's 2002 stem cell debate, certain sections of Australia's media took up an extremely antagonistic stance towards scientists. Alan Trounson in particular, was vilified and the end result was that the Prime Minister cancelled the grant to the National Stem Cell Centre while the claims against Trounson were investigated. Trounson and the NSCC were completely cleared. It is worth examining why certain sections of the media abandoned the principles of fair and balanced reporting to try and bring down a scientist.



**Elizabeth Finkel**  
Independent science writer

After receiving a PhD in Biochemistry from the University of Melbourne, Elizabeth Finkel went on to do five years of post-doctoral research at the University of California in San Francisco. After returning to Australia, Elizabeth traded the laboratory bench for the lap-top. Over the last fifteen years, she has enjoyed writing for both the scientific and lay audience in magazines like Science, Nature Medicine, Lancet, New Scientist as well as for various sections of the Age. She has also broadcast extensively on ABC radio's Ockham's Razor, the Science Show and the Health report.

Dr Finkel has won numerous awards for journalism including the prestigious Michael Daley award, MBF awards and Amgen awards. She was a finalist in the Eureka prize for her 2002 radio feature on stem cells. In April 2005, her book "Stem cells: controversy at the frontiers of science", was published by ABC books and nominated as a finalist for the prestigious Australian government Eureka award for promoting the public understanding of science. Only last week Dr Finkel was announced winner of the Queensland Premier's literary award for best science writer in 2005 and she is currently short-listed for the Victorian Premier's literary award.

## PROMOTING STEM CELL - FUTURE DIRECTIONS

This presentation will appraise the success of stem cell therapy research companies and of the biotech industry generally, in utilising media strategies. This performance will be judged to the extent that it influences public policy to facilitate the commercialisation of intellectual property. Comparisons of performance will be made with other branches of science and other interest groups. Strategies will be suggested for making the stem cell therapy industry relevant to the mainstream media going into the future.



### **LOU CARUANA**

#### **Independent science communication expert**

Lou Caruana is an experienced public relations practitioner and corporate writer with a background in national daily newspapers and magazine editing. He has wide ranging experience in financial and business reporting and has specialised in business, biotechnology, mining and technology. Lou has worked as a strategic adviser to major Australian companies and writes annual reports, media releases, newsletters, brochures and direct mail material. His public relations experience includes strategic counsel, media liaison, product launches and events management. Some of his biotechnology clients have included Sirtex Medical Systems, Imugene, and Norwood Abbey. Corporate clients have included CommSec, Computer Science Corporation, National Australia Bank and Tata Consultancy Services.

After obtaining an arts degree majoring in economics and political science from Charles Sturt University, Lou began his career as a journalist with the *Liverpool Fairfield Champion*, before joining the *Australian Financial Review* as a finance reporter at the age of 23. Following two years with the AFR he relocated to London where he worked as a sub-editor for several Fleet Street newspapers including *The Times*, *The Sunday Times*, and *The Daily Express*. On returning to Australia he edited the prestigious *Australian Mining* magazine before being appointed managing editor of an additional three other magazines covering the biotechnology, building, and construction industries. Lou then returned to daily newspapers, taking up the position of senior business reporter in Melbourne for *The Australian* covering the manufacturing industry and focusing on blue chip industrial companies such as Amcor and Pacifica. He was instrumental in developing a new round at *The Australian* that covered the growing number of biotechnology and advanced manufacturing companies. He wrote about developments in IT and telecommunications as well as editing a section on the dot com sector and writing a column on e-commerce issues.

## NSW Stem Cell Network

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